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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/807,932	03/23/2004	Qingqiao Wei	200314202-1	5174
22879 7590 11/05/2007 HEWLETT PACKARD COMPANY P O BOX 272400, 3404 E. HARMONY ROAD INTELLECTUAL PROPERTY ADMINISTRATION FORT COLLINS, CO 80527-2400			EXAMINER SINES, BRIAN J	
			ART UNIT 1797	PAPER NUMBER
			MAIL DATE 11/05/2007	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

## Office Action Summary

**Application No.**

10/807,932

**Applicant(s)**

WEI, QINGQIAO

**Examiner**

Brian J. Sines

**Art Unit**

1797

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 16 August 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-55 is/are pending in the application.
- 4a) Of the above claim(s) 33-55 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-32 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Election/Restrictions***

Applicant's election without traverse of group I comprising claims 1 – 32 in the reply filed on 8/16/2007 is acknowledged.

Claims 33 – 55 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1 – 32 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 1 – 32 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential elements, such omission amounting to a gap between the elements. See MPEP § 2172.01. The omitted elements are:

Regarding claim 1, it is unclear as to how the device structure facilitates sensing as indicated by the preamble. For example, does the device require the incorporation of a catalyst with the nanowire to provide the capability to sense a specific chemical analyte? The device appears to be inoperable as a sensing device without the inclusion of the catalyst. In claims drawn to an apparatus statutory class of invention, the structure which goes to make up the device must be clearly and positively specified. The structure must be organized and correlated in such a manner as to present a complete operative device (see MPEP § 2172.01). Furthermore,

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a feature that is taught as critical in the specification should be recited in the claims (see MPEP § 2164.08c).

***Claim Rejections - 35 USC § 103***

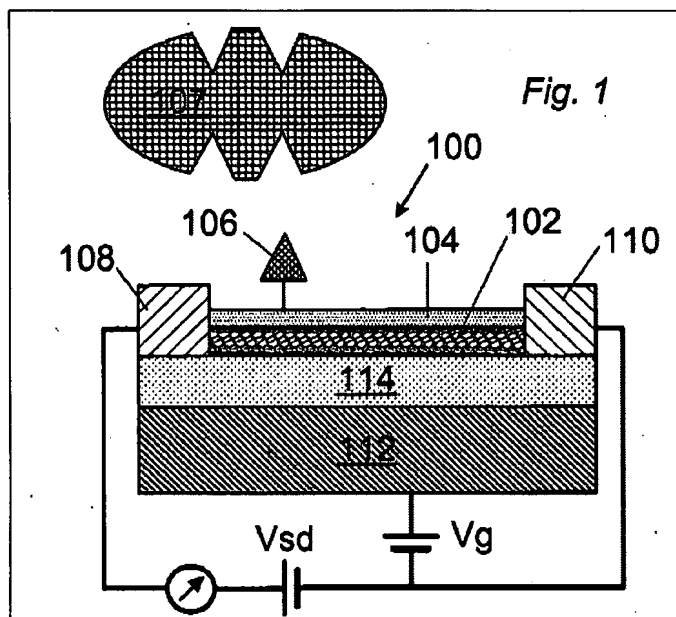
The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
  2. Ascertaining the differences between the prior art and the claims at issue.
  3. Resolving the level of ordinary skill in the pertinent art.
  4. Considering objective evidence present in the application indicating obviousness or nonobviousness.
1. Claims 1 – 20 and 22 – 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bradley et al. (U.S. Pat. Appl. No. US 2006/0228723 A1) (“Bradley”) in view of Chung (U.S. Pat. No. 5,576,563) (“Chung”).

Regarding claims 1, 13 – 16, 22 and 23, Bradley teaches a sensing device 100 having a field-effect transistor configuration comprising; a nanowire or nanotube 102 disposed on an insulating substrate comprising a passivation layer 114 comprising silicon dioxide; two electrical contacts, i.e., source electrode 108 & drain electrode 110; a gate electrode 112 (see, e.g., paragraphs 8 and 47; figure 1). Bradley teaches an additional exemplary device structure in figure 12 (see paragraph 120).



Bradley does not specifically teach the incorporation of a heater with the disclosed device.

Chung does teach that the incorporation of heater with a similar chemical sensor comprising a field-effect transistor configuration affords improved sensor performance. Chung teaches that it has been found to be desirable that the operating temperature be elevated above the ambient temperature to provide improved performance for the sensor (see, e.g., col. 1, lines 9 – 49; col. 3, line 38 – col. 4, line 39).

The use of a known technique to improve similar devices in the same way to provide a predictable result would have been obvious to a person of ordinary skill in the art. See *KSR Int'l v. Teleflex Inc.*, 127 Sup. Ct. 1727, 1742, 82 USPQ2d 1385, 1397 (2007). Therefore, the similar incorporation of a heater with the FET-based chemical sensor of Bradley to afford the predictable and desirable result of improving sensor performance would have been obvious to a person of ordinary skill in the art.

Regarding claims 2 and 11, Bradley teaches the use of silicon nanotubes (see paragraph 9).

Regarding claims 3 and 11, Bradley teaches that the nanotubes can be doped or functionalized. This doping or functionalization of the nanotube inherently changes the conductivity of the nanotube (see, e.g., paragraphs 46 – 51 and 142).

Regarding claims 4 – 10, 12 and 24, Bradley teaches the incorporation of iron catalyst nanoparticles (see, e.g., paragraphs 9 and 51).

Regarding claims 17 – 20, the applicant is advised that the Supreme Court recently clarified that a claim can be proved obvious merely by showing that the combination of known elements was obvious to try. In this regard, the Supreme Court explained that, “[w]hen there is a design need or market pressure to solve a problem and there are a finite number of identified, predictable solutions, a person of ordinary skill in the art has a good reason to pursue the known options within his or her technical grasp.” An obviousness determination is not the result of a rigid formula disassociated from the consideration of the facts of the case. Indeed, the common sense of those skilled in the art demonstrates why some combinations would have been obvious where others would not. The combination of familiar elements is likely to be obvious when it does no more than yield predictable results. See *KSR Int’l v. Teleflex Inc.*, 127 Sup. Ct. 1727, 1742, 82 USPQ2d 1385, 1397 (2007). In this regard, Chung teaches that the heating layer 30 is disposed sufficiently close to gate electrode layer 20 to provide uniform heating thereof (see, e.g., col. 2, lines 31 – 62). It would have been obvious to a person of ordinary skill in the art dispose the integral heater as claimed with the disclosed sensing device in order to facilitate effective temperature control that would impart improve the performance of the sensing device.

Regarding claim 25, Chung teaches the use of a controlled temperature environment with the operation of the disclosed device (see, e.g., col. 3, lines 38 – 67). Therefore, it would have been obvious to a person of ordinary skill in the art to incorporate a temperature sensor as claimed with the disclosed device to facilitate effective temperature monitoring and control.

Regarding claims 26 – 29 and 31, the use of a sensor array configuration comprising a plurality of sensors would have been obvious to a person of ordinary skill in the art. The mere duplication of parts, without any new or unexpected results, is within the ambit of one of ordinary skill in the art (see MPEP § 2144.04).

Regarding claim 30, the incorporation of differently functionalized sensors within sensor arrays for detecting distinct substances is very well known in the art (see MPEP § 2144.03).

Regarding claim 32, the use of non-functionalized control or reference sensors within a sensor array is very well known in the art (see MPEP § 2144.03).

2. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable Bradley and Chung in view of Trautweiler et al. (ref. no.1S) (“Trautweiler”).

Regarding claim 21, neither Bradley nor Chung specifically teaches the incorporation of the substrate configuration as claimed.

The combination of familiar elements is likely to be obvious when it does no more than yield predictable results. See *KSR Int’l v. Teleflex Inc.*, 127 Sup. Ct. 1727, 1742, 82 USPQ2d 1385, 1397 (2007). In this regard, Trautweiler teaches a sensor configuration further comprising a heating device, wherein the sensor configuration has an open or removed portion underneath the sensor and the micromachined diaphragm (see figure 1). Therefore, it would have been

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obvious to a person of ordinary skill in the art dispose the integral heater as claimed with the disclosed sensing device in order to facilitate effective temperature control that would impart improve the performance of the sensing device.

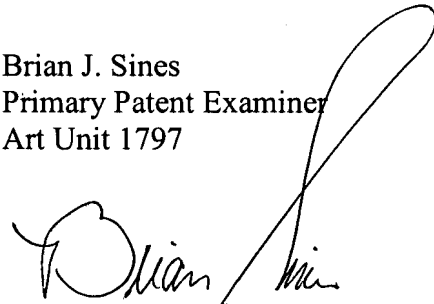
***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian J. Sines whose telephone number is (571) 272-1263. The examiner can normally be reached on Monday - Friday (11 AM - 8 PM EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jill A. Warden can be reached on (571) 272-1267. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Brian J. Sines  
Primary Patent Examiner  
Art Unit 1797

A handwritten signature in black ink, appearing to read "Brian Sines", with a large, stylized loop extending from the end of the signature.